Online Appendix for Prevalence and measurement of anxiety in heart failure patient samples: Systematic review and meta-analysis

A. Example of search strategy

Example search strategy from Ovid MEDLINE (1950-2013), CINAL (1982 -2013), BNI (1985-2013), and Embase (1980-2013)

1. Heart Failure/
2. cardiac adj failure.mp.
3. heart adj failure adj congestive.mp.
4. heart adj decompensation.mp.
5. decompensated adj heart.mp.
6. heart adj failure adj left adj sided.mp.
7. left adj sided adj heart adj failure.mp.
8. myocardial adj failure.mp.
9. cardiomyopathies/
10. cardiac adj patient$.mp.
11. coronary adj patient$.mp.
12. heart adj failure .mp.
13. or/ 1-12
14. Anxiety disorders/
15. anxiety adj disorders.mp.
16. anxieties.mp
17. anxiety adj symptoms.mp.
18. nervousness.mp.
19. worry.mp.
20. mental health.mp. or Mental Health/
21. mood disorders.mp. or Mood Disorders/
22. anxiety.mp. or Anxiety/
23. affective adj disorder$.mp.
24. stress adj psychological.mp.
25. stress adj disorder.mp.
26. psychological adj stress.mp.
27. emotional adj factors.mp.
28. emotional adj stress.mp.
29. panic disorder.mp. or Panic Disorder/
30. Phobic disorders.mp. or Phobic Disorders/
31. obsessive adj compulsive adj disorder.mp
32. agoraphobia.mp or Agoraphobia/
33. post-traumatic adj stress adj disorder.mp
34. or/ 14-33
35. 13 and 34 (heart failure and anxiety)
36. quality of life.mp or "Quality of Life"/
37. health adj related adj quality adj of adj life.mp
38. HRQOL.mp
39. life adj quality$.mp
40. well adj being.mp

41.   life adj satisfaction.mp
42.   or/36-41
43.   13 and 42 (heart failure and quality of life
44.   prevalence.mp. or Prevalence/
45.   13 and 34 and 44 (heart failure and anxiety and prevalence)
46.   35 or 43 or 45 (heart failure and anxiety or heart failure and QoL or heart failure, anx, and prevalence)
47.   limit 46 to (English language and humans)

B. Table to show quality appraisal components of the systematic review

First author, yr	Sampling			Measurement			
	Probability sampling conducted?	**Adequate reporting of Sampling characteristics**	**Response rate reported**	**Anxiety defined**	**Data collection standardised**	**Tool omit somatic symptoms**	**Tool distinguish between anxiety and depression**
Haworth, 2007	No	Yes	Yes 44% No data on non-reponders	Yes	Yes	Yes – HADs Unclear - SCID	Yes – HADs Unclear - SCID
Peters-Klimm et al, 2007	Yes	No Current trial Additional data from author	No	Yes	Unclear from design paper	Yes	Yes
Mitchell, 2012	No	Yes	Yes 93.8% No data on non-responders	No	Yes	Yes	Yes
Geobel, 2009	No	Yes Additional data sent by author	Yes 69.2% Non-responders matched	No	Unclear	Yes	Yes
Muller-Tasch, 2008	No	Yes	Yes 77% No data for non-responders	Yes	Yes	No	Yes
Abrams, 2008	No	Yes	No	Yes	Unclear	Unclear	Unclear

First author, yr	Sampling			Measurement			
	Probability sampling conducted?	Adequate reporting of Sampling characteristics	Response rate reported	Anxiety defined	Data collection standardised	Tool omit somatic symptoms	Tool distinguish between anxiety and depression
Volz, 2012	No	Yes	No	No	Unclear	Yes	Yes
Almeida, 2012	No	Yes	No	No	Yes	Yes	Yes
Chen, 2010	No	Yes	No	No	Unclear	Yes	Yes
Falk, 2009	No	Yes	No	No	Yes	Yes	Yes
Hallas, 2010	No	Yes	Yes 51% No data on non-responder	No	No	Yes	Yes
Mulligan, 2012	No	Yes	Yes 53% Non-responders older, more females, better LVEF	No	Unclear	Yes	Yes
Steptoe, 2000	Yes	Yes	Yes 61% Non reponders matched	No	Yes	Yes	Yes

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First author, yr	Sampling			Measurement			
	Probability sampling conducted?	Adequate reporting of Sampling characteristics	Response rate reported	Anxiety defined	Data collection standardised	Tool omit somatic symptoms	Tool distinguish between anxiety and depression
Eisenberg, 2012	No	Yes	No	Yes	Unclear	Yes	Yes
Junger, 2005	No	Yes	No	No	Unclear	Yes	Yes
Laederach-Hofman, 2007	No	No	No	No	Yes	Yes	Yes
Shen, 2011	Unclear	Yes	No	No	Yes	Yes	Yes
Ansa, 2009	No	Yes	No	No	No	Yes	Yes
Brouwers, 2012	No	Yes	Yes 65.8% No data on non-responders	No	Unclear	Yes	Yes
Damen, 2011	No	Yes	Yes 62% Non-reposnders matched	No	Unclear	Yes	Yes
Dar, 2009	No	Yes	Yes 40%	No	Yes	Yes	Yes

First author, yr	Sampling			Measurement			
	Probability sampling conducted?	**Adequate reporting of Sampling characteristics**	**Response rate reported**	**Anxiety defined**	**Data collection standardised**	**Tool omit somatic symptoms**	**Tool distinguish between anxiety and depression**
		Additional data sent by author	No data on non-responders				
Von Kanel, 2009	No	Yes	No	No	Unclear	Yes	Yes
Freyssin, 2009	Unclear	Yes	No	No	Yes	Yes	Yes
Houchen, 2012	No	No	No	No	No	Yes	Yes
Hermann-Lingen, 2003	No	Yes	No	No	Yes	Yes	Yes
Jolly, 2009	Yes	Yes	No	No	Yes	Yes	Yes
Koukouvou, 2004	Yes	Yes	No	No	Yes	Yes	Yes
Lee, 2005	No	Yes	No	No	Unclear	Yes	Yes
Scherer, 2008	No	Yes	Yes 39% No data on non-responders	No	Yes	Yes	Yes

First author, yr	Sampling			Measurement			
	Probability sampling conducted?	**Adequate reporting of Sampling characteristics**	**Response rate reported**	**Anxiety defined**	**Data collection standardised**	**Tool omit somatic symptoms**	**Tool distinguish between anxiety and depression**
Strauber, 2012	No	Yes	No	No	No	Yes	Yes
Witham, 2008	No	Yes	Yes 65% No data on non-responders	No	Yes	Yes	Yes
Yu, 2007b	No	Yes	No	No	Unclear	Yes	Yes
Yu, 2009	No	Yes	No	No	Yes	Yes	Yes
Zwisler, 2008	Yes	Yes Additional data sent by author	Yes 47% Non-responders did not match responders	No	Yes	Yes	Yes
Freidmann, 2006	No	Yes	No	No	Unclear	Yes	Unclear
Jackson,	Unclear	Yes	No	No	No	Yes	Unclear

First author, yr	Sampling			Measurement			
	Probability sampling conducted?	**Adequate reporting of Sampling characteristics**	**Response rate reported**	**Anxiety defined**	**Data collection standardised**	**Tool omit somatic symptoms**	**Tool distinguish between anxiety and depression**
2011							
Jiang, 2004	No	Yes Additional data sent by author	No	Yes	Yes	Yes	Unclear
Karapolat, 2009	Unclear	Yes	Yes 53% No data on non-responders	No	Unclear	Yes	Unclear
Kulcu, 2007	No	Yes	No	Yes	Yes	Yes	Unclear
Lader, 2003	Unclear	Yes	No	No	Yes	Yes	Unclear
Luyster, 2009	No	Yes	No	No	No	Yes	Unclear
Schweitzer, 2007	No	Yes	No	Yes	Yes	Yes	Unclear
Song, 2008	Unclear	No- abstract additional data sent by author	No	No	Unclear	Yes	Unclear

First author, yr	Sampling			Measurement			
	Probability sampling conducted?	Adequate reporting of Sampling characteristics	Response rate reported	Anxiety defined	Data collection standardised	Tool omit somatic symptoms	Tool distinguish between anxiety and depression
Thomas, 1997	Yes	No Additional data sent by author	No	No	Unclear	Yes	unclear
Tuschihashi - Makaya, 2009	No	Yes	No	No	Yes	Yes	Unclear
Schiffer, 2008	No	Yes	Yes 82% No data on non-responders	No	Yes	No	Unclear
Serafini, 2010	No	Yes	No	No	Yes	No	Unclear
Kostis, 1994	Unclear	Yes	No	No	Yes	No	Unclear
Cully, 2010	Yes	Yes	Yes 76%[1] No data on non-responders	No	Yes	No	Unclear
Paukert, 2009	No	Yes	Yes 8% No data on non-	No	Yes	No	Unclear

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[1] Response rate generated from participants who had been initially screened and consented to take part in study.

First author, yr	Sampling			Measurement			
	Probability sampling conducted?	Adequate reporting of Sampling characteristics	Response rate reported	Anxiety defined	Data collection standardised	Tool omit somatic symptoms	Tool distinguish between anxiety and depression
			responders				
Chung 2009	No	Yes	No	No	No	Yes	Yes
de Jong, 2004	Unclear	Yes Additional data from author	No	Yes	Yes	Yes	Yes
de Jong, 2005	Unclear	Yes	No	No	Yes	Yes	Yes
de Jong, 2011	Unclear	Yes	No	No	Yes	Yes	Yes
Heo, 2008	No	Yes Additional data sent by author	No	No	Yes	Yes	Yes
Dekker, 2012[2]	Unclear	No	No	No	Unclear	Yes	Yes

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[2] Abstract

First author, yr	Sampling			Measurement			
	Probability sampling conducted?	Adequate reporting of Sampling characteristics	Response rate reported	Anxiety defined	Data collection standardised	Tool omit somatic symptoms	Tool distinguish between anxiety and depression
Huang, 2011[3]	Unclear	No	No	No	Unclear	Yes	Yes
Huang, 2012[4]	Unclear	Yes	No	No	Unclear	Yes	Yes
Khalil, 2011	No	Yes	No	No	Unclear	Yes	Yes
Lee, 2013	Unclear	Yes	No	No	No	Yes	Yes
Moser, 2009	Unclear	Yes	No	No	Unclear	Yes	Yes
Steinke, 2008	No	Yes	No	No	Yes	Yes	Yes
Evangelista, 2009	No	Yes	No	No	No	Yes	Yes
Barrow, 2007	No	No Additional data sent from	Yes 24% No data on none responders	No	Yes	Yes	Yes

[3] Abstract
[4] Abstract

First author, yr	Sampling			Measurement			
	Probability sampling conducted?	Adequate reporting of Sampling characteristics	Response rate reported	Anxiety defined	Data collection standardised	Tool omit somatic symptoms	Tool distinguish between anxiety and depression
		author					
Covera-Tindel, 2009	No	Yes Additional data from author	No	No	Yes	No	Unclear
Dracup, 2003	No	Yes	No	No	Yes	No	Unclear
Dracup, 2007	No	Yes	No	No	No	No	Unclear
Moser, 2005	No	Yes	No		Yes	No	Unclear
Moser et al, 2010	No	Yes	No	Partially	Yes	No	Unclear
Clarke, 2000	Yes	Yes	Yes 73% No data on non-responders	No	Yes	Unclear	Unclear
Doering, 2004	No	Yes	No	No	Yes	Unclear	Unclear

First author, yr	Sampling			Measurement			
	Probability sampling conducted?	**Adequate reporting of Sampling characteristics**	**Response rate reported**	**Anxiety defined**	**Data collection standardised**	**Tool omit somatic symptoms**	**Tool distinguish between anxiety and depression**
Sullivan, 2009	No	Yes	No	No	Yes	Unclear	Unclear

Table C. To show whether anxiety measures distinguish between anxiety and depression and omit somatic items in the assessment of anxiety

Measurement tool	Omit somatic items*	Distinguish between anxiety and depression*
SCID	Unclear	Yes
ICD-9 codes	Unclear	Unclear
GAD-7	Yes	Yes
PHQ	No	Yes
HADS	Yes	Yes
STAI	Yes	Unclear
HARS	No	Unclear
GAI	No	Unclear
BSI-A	Yes	Yes
MACCL	No	Unclear
POMS	Unclear	Unclear

*Determined by analysis of measures conceptual development, content and from empirical research of tools psychometric properties.

D. Included studies participant characteristics and anxiety outcomes

First author, yr.	Participant characteristics	Anxiety		
	Age (yrs, sd) Gender freq (%) Ethnicity freq (%) NYHA class Freq (%) LVEF Mean % (SD)	Anxiety Measure	Symptom Score mean (SD)	Prevalence sample above cut-off for anxiety %
Anxiety Disorders				
Haworth, 2007[5,6]	88 Outpatients UK 69.9 yrs (7.6) 73 male (83%) Ethnicity not reported NYHA I (7%); II (62%); III (22%); IV (1%), missing data – 7 (8%) LVEF 35% (8)	SCID – I (GAD)	-	11.4%
Peters-Klimm et al, 2007[7]	199 Outpatients Germany 69.6 yrs (9.8) 146 male (73%) Ethnicity not reported NYHA I (3%); II (64%); III (32%); IV (1%) LVEF 37% (7.3)	GAD – 7 >10	3.6 (3.5)	6.3%
Mitchell, 2012	129 Setting unclear USA 61.2 yrs 84 Male (65%) White (54%) Clinical characteristics not reported	GAD -7 > 10	5.05 (5.7)	23%

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[5] Same sample as Haworth 2005
* Proportion calculated using PQRS software
[6] Reference repeated using HADs data for narrative but not statistical synthesis
[7] Additional unpublished data from trial sent by Muller-Tasch

First author, yr.	Participant characteristics	Anxiety		
	Age (yrs, sd) Gender freq (%) Ethnicity freq (%) NYHA class Freq (%) LVEF Mean % (SD)	Anxiety Measure	Symptom Score mean (SD)	Prevalence sample above cut-off for anxiety %
Geobel, 2009	96 Veteran Outpatients USA 67.2 yrs (11) 92 Males (96%) African American (27%), White (58%), Other (15%) NYHA class not reported LVEF 39.1% (16.7)	GAD 2	1.62 (1.97)	26%
Muller-Tasch, 2008	258 Outpatients Germany 62.1 (11.8) 199 male (77%) All white NYHA I (4%); II (47%); (38%); IV (1%), missing (10%) LVEF 30.8% ()	PHQ – Panic disorders and other anxiety disorders	-	9.3% panic disorder 6.6% had other unspecified anxiety disorders
Abrams, 2008	15, 146 Mixed USA 70.7yrs (11.5) 14, 843 male (98 %) White (58%), Black (20%), Hispanic (1%), Missing (21%) Clinical characteristics not reported	ICD-9-CM Anxiety disorders codes (GAD) diagnosed using medical notes	-	Inpatients: 1.4% Outpatients: 11.7%

Clinical levels of anxiety symptoms

First author, yr.	Participant characteristics	Anxiety		
Volz, 2012	111 Outpatients Switzerland 57 yrs (14) 91 Males (82%) Ethnicity not reported NYHA I (23.4%/); II (59.5%); III 16.2%); IV (0.9%) LVEF 32.6% (13.6)	Self reported HADS 15-21 11-14 8-10 8>	-	3.6% 5.4% 19% 28.8%

First author, yr.	Participant characteristics	Anxiety		
	Age (yrs, sd) Gender freq (%) Ethnicity freq (%) NYHA class Freq (%) LVEF Mean % (SD)	Anxiety Measure	Symptom Score mean (SD)	Prevalence sample above cut-off for anxiety %
Almeida, 2012	77 Outpatients and community volunteers Australia 64.4 yrs (10.2) 64 Males (83%) Ethnicity not reported NYHA class not reported LVEF 29.3% (7.8)	Self reported HADS 11>	1(0, 3)[8]	6.2%
Chen, 2010	105 Outpatients Taiwan 65.2 yrs (15.1) 68 male (65%) Ethnicity not reported NYHA I (3%); II (42%); III (51%); IV (4%) LVEF not reported	Self reported HADS 11> 8-10	-	7% 15.2%
Falk, 2009	112 Inpatients Sweden 77 yrs (10) 67 male (60%) Ethnicity not reported NYHA II (18%); III (73%); IV (6%) LVEF <40% - 55 (49%)	Self reported HADS 11 >	4.9 (3.9)	10%
Hallas, 2010	146 Outpatients UK 48.6 yrs (9.5) 120 Males (82%) White (88%) NYHA class not reported LVEF 38.2% (15.1)	Self reported HADS 11> 8>	8.43 (4.8)	30% 56%
Mulligan, 2012[9]	166 Mixed setting UK 73 yrs (median) (IQR 25-91) 111 male (67%)	Self reported HADS		

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[8] Median and Inter-Quartile Range
[9] Six month anxiety data

First author, yr.	Participant characteristics	Anxiety		
	Age (yrs, sd) Gender freq (%) Ethnicity freq (%) NYHA class Freq (%) LVEF Mean % (SD)	Anxiety Measure	Symptom Score mean (SD)	Prevalence sample above cut-off for anxiety %
	Ethnicity not reported NYHA I (27%); II (58%); III (14%); IV (1%) LVEF not reported	11> 8>		10.4% 11.4%
Steptoe, 2000	60 Outpatients UK 47.6 yrs (14.4) 40 male (67%) Ethnicity not reported NYHA I (60 %); II (33%); III/IV (7%) LVEF not reported	Self reported HADS 11>	8.10 (3.9)	52%
Eisenberg, 2012	273 Outpatients USA 53.5 yrs (11.6) 186 male (68%) White (29%), African American (24%), Hispanic (41%), Other (6%) NYHA I (24%); II (45%); III (27%); IV (4%) LVEF 27% (13)	Self reported HADS 10> 8-10	-	21% 24%
Junger, 2005	209 setting not reported Germany 54 (10) 180 male (86%) Ethnicity not reported NYHA I (12%); II (44%); III (44%) LVEF 22% (10)	Self reported HADS –D German version 10 >	7.0 (4.0)	22%
Laederach-Hofman, 2007	25 Outpatients Switzerland Age not reported 20 male (80%) Ethnicity not reported NYHA I (44%); II (40%); III (16%)	Self reported HADS 10>	5.5 (4.1)	14%

First author, yr.	Participant characteristics	Anxiety		
	Age (yrs, sd) Gender freq (%) Ethnicity freq (%) NYHA class Freq (%) LVEF Mean % (SD)	Anxiety Measure	Symptom Score mean (SD)	Prevalence sample above cut-off for anxiety %
	LVEF 28.7% (7..2)			
Shen, 2011	238 Outpatients USA 54.1 yrs (11) 163 male (68%) White (26%), African American (24%), Hispanic (44%), Other (5%) NYHA I (14%); II (42%); III (37%); IV (6%) LVEF not reported	Self reported HADS 10> 8-10		21% 24%
Ansa, 2009	111 Outpatients Nigeria Not reported 61 male (55%) African Black (100%) NYHA II (2%); III (4%); IV (94%) LVEF not reported	Self reported HADS 8>	-	16%
Brouwers, 2012	94 Outpatients Denmark 62 yrs (9) 75 male (80%) Ethnicity not reported NYHA I (3%); II (65%); III (32%) LVEF 26.1% (6.8)	Self reported HADS 8>	5 (4.5)	23.4%
Damen, 2011	237 Outpatients Netherlands 66.9 yrs (8.7) 51 Males (21.5%) Ethnicity not reported NYHA I/II (91%) LVEF 33.6% (6.7)	Self reported HADS 8>	-	25%

First author, yr.	Participant characteristics	Anxiety		
	Age (yrs, sd) Gender freq (%) Ethnicity freq (%) NYHA class Freq (%) LVEF Mean % (SD)	Anxiety Measure	Symptom Score mean (SD)	Prevalence sample above cut-off for anxiety %
Dar, 2009[10]	182 outpatients UK 71.7 yrs (11.62) 121 male (66%) South Asian (20%) Clinical characteristics not reported	Self reported HADS 8 >	5.74 (4.65)	28%
Von Kanel, 2009	56 Outpatients Switzerland 58 yrs (12) 47 male (84%) Ethnicity not reported NYHA not reported LVEF 36.5% (7.2)	Self reported HADS –G German version 8>	4.5 (3.4)	21%
Haworth, 2007[11,12]	88 Outpatients UK 69.9 yrs (7.6) 73 male (83%) Ethnicity not reported NYHA I (7%); II (62%); III (22%); IV (1%), missing data – 7 (8%) LVEF 35% (8)	Admin HADS 7 >	-	17%
Freyssin, 2009	26 Setting not reported France 54.5 yrs (10.50) 13 Male (50%) Ethnicity not report NYHA class not reported LVEF 29.10%	Self reported HADS	7.09 (2.10)	-
Houchen, 2012	17 Inpatients UK 67.3 yrs (10.4)	Self reported	5 (4.40)	-

[10] Additional data sent by author
[11] Same sample as Haworth 2005
* Proportion calculated using PQRS software
[12] Reference repeated - additional anxiety data from paper

First author, yr.	Participant characteristics	Anxiety		
	Age (yrs, sd) Gender freq (%) Ethnicity freq (%) NYHA class Freq (%) LVEF Mean % (SD)	Anxiety Measure	Symptom Score mean (SD)	Prevalence sample above cut-off for anxiety %
	13 Males (77%) Ethnicity not reported Clinical characteristics not reported	HADS		
Hermann-Lingen, 2003	46 Mixed Germany 62.4 (14.2) 40 male (87%) Ethnicity not reported NYHA I (15%); II (41%); III - (24%); IV - (20%) LVEF 28% (9)	Self reported HADS	6.4 (4.0)	-
Jolly, 2009	169 Outpatients UK 68 (12.6) 126 male (75%) White (77%) NYHA I (6%); II (74%); III (20%) LVEF not reported	Self reported HADS	5.76 (4.2)	-
Koukouvou, 2004	26 Outpatients Greece 52.5 (9.7) 26 male (100%) Ethnicity not reported NYHA II (58%); III (42%) LVEF not reported	Self reported HADS	12.4 (1.60)	-
Lee, 2005[13]	227 Inpatients Hong Kong 77.1 (7.9) 108 male (47.6%) Ethnicity not reported NYHA I (12%); II (50%); III (34%) IV (4%) LVEF not reported	Self report HADS –C Chinese version	5.15 (3.90)	-

[13] Same sample as Yu 2004

First author, yr.	Participant characteristics	Anxiety		
	Age (yrs, sd) Gender freq (%) Ethnicity freq (%) NYHA class Freq (%) LVEF Mean % (SD)	Anxiety Measure	Symptom Score mean (SD)	Prevalence sample above cut-off for anxiety %
Scherer, 2008[14]	310 Outpatients Germany 72.9 yrs (9) 145 male (46.7%) Ethnicity not reported NYHA I (52%); II (35%); III (8%); IV (2%); missing data - 9 (3%) LVEF not reported	Self reported HADS	5.9 (3.7)	-
Strauber, 2012	105 Outpatients USA 59.7 yrs (10.7) 89 Males (85%) Ethnicity not reported NYHA class not reported LVEF 27.3% (6.9)	Self reported HADS	5.4 (3.9)	-
Witham, 2008	17 Outpatients UK 81.6 yrs (5.5) 12 male (70.6%) Ethnicity not reported NYHA class II (47%); III (53%) LVEF not reported	Self reported HADS	2.1 (2.2)	-
Yu, 2007b[15]	153 Outpatients China 75.1 yrs (7.9) 77 male (50.3%) Ethnicity not reported NYHA II (60%); III (40%) LVEF not reported	Self reported HADS –C Chinese version	4.3 (3.9)	-
Yu, 2009	95 Setting unclear China 64.2 yrs (12)	Self reported	5.85 (3.67)	-

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[14] Same sample as Scherer, 2007
[15] Same sample as Yu 2007a

First author, yr.	Participant characteristics	Anxiety		
	Age (yrs, sd) Gender freq (%) Ethnicity freq (%) NYHA class Freq (%) LVEF Mean % (SD)	Anxiety Measure	Symptom Score mean (SD)	Prevalence sample above cut-off for anxiety %
	64 male (67.4) Ethnicity not reported NYHA class not reported LVEF <40% - 59 (62%)	HADS – C Chinese version		
Zwisler, 2008[16]	91 Outpatients Denmark 71.4 yrs (11.4) 57 male (63%) Ethnicity not reported Clinical characteristics not reported	Self reported HADS	9.5 (1.9)	-
Freidmann, 2006	149 Outpatients, USA, Canada & NZ 60.8 yrs (10.9) 186 male (64%) White (87%) White 130 (87%) NYHA II (75%), III (25) LVEF 25.3% (6.9)	Self report STAI –S 40 >	36.7 (11.6)	45%
Jackson, 2011	35 Outpatients USA 55.7 yrs (14.5) All female White (60%), African American (40%) NYHA class not report LVEF 42% (15.8)	Self report STAI - S	41.3 (10.9)	-
Jiang, 2004[17]	291 Inpatients USA 63 yrs (13) 186 male (64%) White (72%), Black (18%), Other (4%)	Self report STAI 40 >	State 33.5 (12.8) Trait 33.5(11.7).	State 29% Trait 28%

[16] Additional data sent by author
[17] Additional data from Jiang et al (2001)

First author, yr.	Participant characteristics	Anxiety		
	Age (yrs, sd) Gender freq (%) Ethnicity freq (%) NYHA class Freq (%) LVEF Mean % (SD)	Anxiety Measure	Symptom Score mean (SD)	Prevalence sample above cut-off for anxiety %
	NYHA II (53%); III (39%); IV (8%) LVEF 30.2% (13.2)			
Karapolat, 2009	69 Outpatients Turkey 44.6 yrs (12.5) 43 Males (62%) Ethnicity not reported NYHA II (62%); III (38%) LVEF not reported	Self report STAI	State 44.8 (9.04) Trait 44.5 (11.2)	-
Kulcu, 2007	44 setting not reported Turkey 59.3 (10.7) 32 male (72%) Ethnicity not reported NYHA II/III 44 (100%) LVEF 34.6% (13.3)	Self reported STAI	State 42.8 (14.7) Trait 61.6 (10.1)	- -
Lader, 2003	589 Setting not reported USA 64.6 (11.7) 433 male (73.5%) None white (14%) NYHA (14%); II (54%); III (30%); IV (2%) LVEF 34.7% (13.2)	Self reported STAI – S	16.40 (7.2)	-
Luyster, 2009	88 Outpatients USA 70 yrs (10.7) 68 male (77%) White (82%), African American (15%), American Indian or Alaska native (2%), Asian (1%) NYHA I (46%); II (52); III (2%) LVEF not reported	Self reported STAI – T 40>	35.6 (10)	36%

First author, yr.	Participant characteristics	Anxiety		
	Age (yrs, sd) Gender freq (%) Ethnicity freq (%) NYHA class Freq (%) LVEF Mean % (SD)	Anxiety Measure	Symptom Score mean (SD)	Prevalence sample above cut-off for anxiety %
Schweitzer, 2007	115 Mixed Australia 63.6 yrs (14.2) 72 male (70%) Ethnicity not reported NYHA I (6%); II (27%); III (57%); IV (10%). LVEF 32.9% (0.7)	Self reported STAI – T 40 >	35.47 (10.35)	31%
Song, 2008[18]	260 Inpatients Korea 63 yrs (9) 145 male (56%) Ethnicity not reported NYHA III/IV - 125 (48%) LVEF not reported	Self reported STAI-T 40>	50.8 (8.5)	-
Thomas, 1997[19]	66 Outpatients USA & Canada 64.7 yrs (1.1) 45 male (38%) White (58%), Black (23%), Hispanic (9%), American Indian Inuit (5%), Asian (2%) NYHA I (29%); II (58%); III (13%) LVEF not reported	Self reported STAI	State 41.58 (1.620) Trait 40.58 (20-67)	State cut off >40 47.1% anxious Trait cut off >40 54.5% anxious
Tuschihashi - Makaya, 2009	139 outpatients Japan 67.6 yrs (12.9) 91 male (66%) Ethnicity not reported NYHA I (32%); II (52%); III (16%) LVEF 48.2% (18)	Self reported STAI -S	36.6 (9.1)	37%

[18] Abstract, additional data sent by author
[19] Additional data sent by author

First author, yr.	Participant characteristics	Anxiety		
	Age (yrs, sd) Gender freq (%) Ethnicity freq (%) NYHA class Freq (%) LVEF Mean % (SD)	Anxiety Measure	Symptom Score mean (SD)	Prevalence sample above cut-off for anxiety %
Schiffer, 2008	149 Outpatients Holland 66 yrs (8.6) 118 male (79%) Ethnicity not reported NYHA III/IV – 72 (48%) LVEF 30% (7)	Interview HARS >17	-	11%
Serafini, 2010	120 Unclear setting Italy 59.7 yrs (12) 79 Males (66%) Ethnicity not reported NYHA I (15%); II (30%); III (30%); IV (25%) LVEF not reported	Interview HARS	14.1 (2.6)	-
Kostis, 1994	20 setting not reported USA 65.7(6.1) 14 (70%) Ethnicity not reported NYHA II (95%); III (5%) LVEF 33.8% (7)	Interview HARS	13.1 (8.7)	-
Cully, 2010	96 Veteran Outpatients USA 71.89 yrs (7.83) 95 Males (99%) White (74%) NYHA II (11.5%); III (41.7%); IV (46.9%) LVEF not reported	Self report GAI	4.99 (5.48)	-
Paukert, 2009[20]	104 Veteran Outpatients USA 71.7 yrs (7.7) 103 male (99%) White (70%), African American (23%), Hispanic	Self reported GAI >8	5.04 (5.47)	24%

[20] Same sample as Cully, 2008

First author, yr.	Participant characteristics	Anxiety		
	Age (yrs, sd) **Gender freq (%)** **Ethnicity freq (%)** **NYHA class Freq (%)** **LVEF Mean % (SD)**	**Anxiety Measure**	**Symptom Score mean (SD)**	**Prevalence sample above cut-off for anxiety %**
	(7%) NYHA II (11%); III (39%); IV (50%) LVEF not reported			
Elevated anxiety symptom scores				
Chung, 2009	58 Outpatients USA 61 yrs (12) 43 male (74%) White (93%), African American (7%) NYHA III/IV- 24 (43%) LVEF 34.2% (13)	Self reported BSI – A 0.35	0.64 (0.76)	43.1%
de Jong, 2004[21]	32 Outpatients USA 53.5 yrs (13.3) 22 male (69%) White (85%), Black (12%), American Indian (3%) Clinical characteristics not reported[22]	Self reported BSI –A 0.35	0.98 (0.89)	62.5%
de Jong, 2005	87 Outpatients USA 72 yrs (11) 45 male (52%) White (89%), Black (11%) NYHA II (47%); III (47%); IV (6%) LVEF 38% (15)	Self reported BSI -A 0.35	0.90 (0.70)	72.3%
de Jong, 2011	147 Outpatients USA 61 yrs (11) 44 males (30%)	Seld reported BSI-A		

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[21] Additional data provided by author
[22] Paper cites reference for clinical characteristics that can not be located

First author, yr.	Participant characteristics	Anxiety		
	Age (yrs, sd) Gender freq (%) Ethnicity freq (%) NYHA class Freq (%) LVEF Mean % (SD)	Anxiety Measure	Symptom Score mean (SD)	Prevalence sample above cut-off for anxiety %
	White (88%), Black (11%) NYHA I (6%), II (32%), III (44%), IV (15%) LVEF 35% (14)	0.35	0.71 (0.7)	54.1%
Evangelista, 2009[23]	241 outpatients USA 56.7 yrs (13) 168 male (70%) White (70%), Hispanic (23%), Black (7%) NYHA II (35%); III (54%); IV (11%) LVEF 26.5% (7)	Self reported BSI – A > 0.98	0.96 (1. 7)	40%
Dekker, 2012	635 Mixed Setting USA 62 yrs (12) 406 male (64%) Ethnicity not reported NYHA III/IV (56%) LVEF not reported	Self reported BSI –A > 0.35	0.72 (0.5)	55%
Heo, 2008[24,25]	84 outpatients USA 65 yrs (17) 51 male (61%) White non-Hispanic (86%), African American (13%), Other (1%) NYHA II (44%); III (33%); IV (6%) LVEF 36% (16)	Self reported BSI –A > 0.35	0.86 (0.71),	70%
Huang, 2011	39 Outpatients USA 60.80 yrs (11.70) 25 males (64%)	Self reported BSI-A	0.53 (0.7)	-

[23] Additional data provided by author

[24] Additional data sent by author

[25] Same sample as Heo 2007a, 2007b

First author, yr.	Participant characteristics	Anxiety		
	Age (yrs, sd) **Gender freq (%)** **Ethnicity freq (%)** **NYHA class Freq (%)** **LVEF Mean % (SD)**	**Anxiety Measure**	**Symptom Score mean (SD)**	**Prevalence sample above cut-off for anxiety %**
	Ethnicity not reported NYHA I (8%); II (46%); III (38%); IV (8%) LVEF not reported			
Huang, 2012	489 Outpatients USA & Taiwan 61.7 yrs (13) 344 male (70.3%) Taiwanese (45.8%) NYHA I (11%); II (47%); III (31%); IV (11%) LVEF not reported	Self reported BSI-A	0.58 (0.7)	-
Khalil, 2011	590 Outpatients USA & Australia 63 yrs (13) 378 Males (64%) White (74%) NYHA I/II (64%); III/IV (53%) LVEF 35% (15)	Self reported BSI-A 0.35	0.68 (0.7)	-
Lee, 2013	202 Outpatients USA 56.9 yrs (13.3) 101 Males (50%) White (86%) NYHA II (40%); III (56%); IV (4%) LVEF 28.6% (12.4)	Self reported BSI-A	0.52 (0.6)	-
Moser, 2009[26]	146 Outpatients USA 68 yrs (13) 80 male (84.8%) White (59%) NYHA I (2%); II (40%); III (47%); IV (8%)	Self reported BSI -A	0.86 (0.8)	-

[26] Same sample as Dejong 2008

First author, yr.	Participant characteristics	Anxiety		
	Age (yrs, sd) Gender freq (%) Ethnicity freq (%) NYHA class Freq (%) LVEF Mean % (SD)	Anxiety Measure	Symptom Score mean (SD)	Prevalence sample above cut-off for anxiety %
	LVEF 36 (15)			
Steinke, 2008	85 Outpatients USA 60.6 yrs (10.6) 52 male (61%) White (88%), African American (12%) NYHA I (7%); II (28%); III (45%); IV (20%) LVEF 33% (13)	Self reported BSI -A	0.83 (0.8)	-
Barrow, 2007	65 Outpatients UK 68.1 yrs (8.7) 53 male (82%) Ethnicity not reported Clinical characteristics not reported	SCL – R anxiety sub-scale	56.2 (12.5)	-
Covera-Tindel, 2009[27]	76 Outpatients USA 62.9 yrs (10.6) 76 male (100%) White (49%) NYHA II (80%); III/IV (20%) LVEF 27.3% (8.8)	Self reported MAACL	5.1 (3.6)	-
Dracup, 2003	222 Outpatients USA 57 yrs (12.5) 181 male (82%) Ethnicity not reported NYHA I (14%); II (27%); III (46%); IV (13%) LVEF 25.8% (7.6)	Self reported MAACL	7.5 (5.1)	-

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[27] **Additional design data from Covera-Tindel et al (2004)**

First author, yr.	Participant characteristics	Anxiety		
	Age (yrs, sd) Gender freq (%) Ethnicity freq (%) NYHA class Freq (%) LVEF Mean % (SD)	Anxiety Measure	Symptom Score mean (SD)	Prevalence sample above cut-off for anxiety %
Dracup, 2007	173 Outpatients USA 54 yrs (12.5) 123 male (71.1%) White (60%) NYHA II (27%); III (63%); IV (10%) LVEF 26.4 % (6.8)	Self reported MAACL	7.4 (4.6)	-
Moser, 2005	202 Outpatients USA 70 yrs (12) 99 male (49%) White (88%), African American (12%) NYHA I (1 %); II (30%); III (40%); IV (26%) LVEF not reported	Self reported MAACL 7 >	7.8 (4.6)	50%
Moser et al, 2010[28]	478 Outpatients USA 65.6 yrs (9.2) 355 male (74%) White (65%). African American (9.4%), Hispanic (7.5%), Other (8.8%) NYHA class not reported LVEF 29.5 (12.2)	Self reported MAACL	6.9 (4.7)	-
Clarke, 2000	2993 Unclear setting USA 60.1yrs (10.0) 2558 male (86%) White (84%), Black (12%), Hispanic (2%), Other (2%) NYHA I (44%); II (43%); III/IV (13%) LVEF 26.7% (6.4)	Self reported POMS – Anxiety and Tension subscale	8.5 (6.6)	-
Doering,	87 Outpatients USA	Self	15.2 (6.2)	-

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[28] Unpublished manuscript sent by author

First author, yr.	Participant characteristics	Anxiety		
	Age (yrs, sd) Gender freq (%) Ethnicity freq (%) NYHA class Freq (%) LVEF Mean % (SD)	Anxiety Measure	Symptom Score mean (SD)	Prevalence sample above cut-off for anxiety %
2004	54 yrs (11) 59 male (70%) White (70%), Hispanic (10%), African American (8%), Asian Pacific Islander (4%), American Indian (1%) NYHA I (3 %); II (21%); III (49%); IV (27%) LVEF 25% (8)	reported POMS – Anxiety and Tension subscale		
Sullivan, 2009	208 Outpatients USA 61.3 (13.6) 146 male (70%) White (63%) NYHA I (9 %); II (46%); III (37%); IV (8%) LVEF 25 % (20.3)	Self reported POMS – Anxiety and Tension subscale	9.6 (6.5)	-

Yrs= years; sd = standard deviation; freq = frequency; % = percentage; NYHA = New York Heart Association; UK= United kingdom; LVEF = Left ventricular Ejection Fraction; GAD = Generalised Anxiety Disorder 7 item; SCID = Structured Clinical Interview –I; PHQ = Patient Health Questionnaire; HADS = hospital Anxiety and Depression Scale; HADS G = HADS german; HADS – C = HADS Chinese; STAI – s = State Trait Anxiety Inventory state scale; STAT – t = State Trait Anxiety Inventory trait scale; HARS = Hamilton Anxiety Rating Scale; GAI = Geriatric Anxiety Inventory; BSI-A = Brief Symptom Inventory – anxiety; SCL =r = Symptom Checklist –revised; MAACL = Multiple Affect Adjective Checklist; POMS = Profile of Mood States.

E. Univariate meta-regression for overall anxiety, anxiety disorder, clinical anxiety and elevated symptoms of anxiety: values of β, se[β], and the significance of β for each study characteristic.

Characteristic of study	Overall Anxiety (22-38 obs) β, (se[β]), p	Anxiety disorders (4-6 obs) β, (se[β]), p	Clinical Anxiety (13-24 obs) β, (se[β]), p	Elev symp anx (5-8 obs) β, (se[β]), p
Age: Yrs mean	-1.01(0.41) p=0.020*	-0.70 (0.84) p=0.45	-1.12(0.31)p=0.002*2	0.89 (0.71) p=0.259
Age: < 59 yrs versus 60-69 < 59 yrs versus 70 +	-12.33 (7.14) p=0.94 -4.48	Co linearity	-11.8(6.3) p=0.07 -14.2(8.11) p=0.09	6.5 (11.4) p=0.59 11.50 (13.0) p= 0.14
Gender: % males in sample	-0.62 (0.21) p=0.006*	0.07 (0.30) p=0.84	-0.29 (0.23) p=0.22	-0.51 (0.44) p=0.29
Setting: Outpatient versus Inpatient Outpatient versus Mixed	13.54 (13.69) p=0.33 2.97 (11.0) p=0.80	Co linearity	10.61 (10.6) p=0.33 -3.93 (10.7) p=0.7	Co linearity 0.68 (12.9) p =0.96
LVEF: % means	0.79 (0.7) p=0.27	1.30 (1.4) p=0.45	054 (0.64) p=0.42	0.73 (1.5) p=0.63
NYHA: Mild versus mod/severe Mild versus Mixed	-8.06 (11.0) p=0.47 0.25 (7.6) p=0.97	Insuff obs	-17.3 (7.7) p=0.038* -5.27 (5.6) p=0.36	Co linearity 0.88 (14.4) p=0.95
Design: RCT versus uncontrolled RCT versus cohort RCT versus case controlled RCT versus case series	-3.01 (22.3) p=0.89 13.42 (13.1) p=0.32 32.7 (16.3) p=0.05* 14.12 (13.1) p=0.29	Insuff obs	-14 (20.3) p=0.50 2.21 (14.4) p=0.89 17 (19.5) p=0.39 -2.56 (14.3) p=0.86	Insuff obs -5.1 (12.5) p=0.71 11.8 (11.7) p=0.37

Country: ·				
USA versus UK[$]	-20.0 (5.8) p=0.002**	Insuff obs	-11.3 (7.5) p=0.15	Co linearity
USA versus Asia	-13.7 (12.2) p=0.27		-8.4 (11.9) p=0.49	
USA versus Australasia	-12.2 (16.9) p=0.78		-6.88 (15.6) p=0.67	
USA versus mixed	-17.9 (12.1) p=0.15		-12.7 (15.5) p=0.18	
USA versus Africa	-27.2 (16.7) p=0.11		-21.9 (15.5) p=0.18	
Concept of anxiety:				
Anx Dis[2] versus Clin Anx	14.40 (5.6) p=0.015*			
Anx Dis versus Elev Symp	41.24 (6.8) p = 0.000**			

[$]
UK and Europe
* Significant at the 0.05 level
** Significant at the 0.01 level
Obs (observations); LVEF (Left Ventricular Ejection Fraction; NYHA (New York Heart Association); RCT (Randomised Controlled Trial);
Insuff obs (Insufficient observations); Anx Dis (anxiety disorders); Clin Anx (clinical anxiety); Elev Symp anx(elevated symptoms of anxiety)